



Optimizing Gene Editing in NK Cells for Therapy and Research

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Genome-Edited Primary NK Cells for Cancer Immunotherapy

Targeted nucleases are used for the first time to optimize gene editing in primary human natural killer (NK) cells. The new method, which boasts never-before-seen efficiencies, includes a genome-edited primary NK cell, methods for editing a primary NK cell genome, and methods of administering a genome-edited primary NK cell. The primary NK cell may be rested or stimulated: it may be a CD3-CD56+ cell or a stimulated NK cell. This success of this high efficiency gene editing approach stems from optimized culture conditions, electroporation protocol, and using an “all RNA,” chemically modified CRISPR/Cas9 gRNA system and high quality Cas9 mRNA/proteins. The genome-edited primary NK cells show potential in cancer immunotherapy, as the technology can be used to knock out or edit specific genes to enhance NK cells’ ability to expand, survive, and/or kill cancer cells.

Longer Persistence than T cells for Immunotherapy

Human natural killer (NK) cells are notoriously difficult to work with in culture, and to date, using target nucleases in primary human NK cells has not been demonstrated. NK cells are a viable alternative to using T cells for immunotherapy, as they persist longer and do not face rejection issues. Furthermore, NK cells do not require a CAR or other engineered receptor to find cancer cells. Biotherapeutics are currently limited by the half-life of protein therapies: proteins delivered to cells eventually break down in the body and must be replaced. This technology provides a longer-lasting supply of necessary proteins to patients and can be customized as an anti-cancer therapy to kill the patient’s own cancer cells.

BENEFITS AND FEATURES:

- Targeted nucleases used for gene editing in primary human NK cells
- Cancer immunotherapy
- May enhance NK cells’ ability to expand, survive, and/or kill cancer cells
- May treat many different cancers
- Uses optimized culture conditions and electroporation protocol
- Chemically modified CRISPR/Cas9 gRNA system
- High quality Cas9 mRNA/proteins

APPLICATIONS:

- Cancer treatment

- Targeted immunotherapy for cancer
- Therapeutic applications
- Research

Phase of Development - In Vivo/animal studies

Researchers

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[External Link](http://www.pediatrics.umn.edu) (www.pediatrics.umn.edu)

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